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Title and author (if document is unnumbered)
Operating Manual Carbon ~~reactor~~ Mixing Plant Building 1410 Vol XXIV
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EXTRACT FROM OPERATING MANUAL (OM-41) CARBON MIXING PLANT BUILDING K-1410 VOLUME XXIV

Compiled by
S. G. Thornton
Environmental Management Division
OAK RIDGE K-25 SITE
for the Health Studies Agreement

October 2, 1995

Oak Ridge K-25 Site
Oak Ridge, Tennessee 37831-7314
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY
under Contract DE-AC05-84OR21400

OPERATING MANUAL

CARBON MIXING PLANT

BUILDING K-1410

VOLUME XXIV

OM 41

UNCLASSIFIED

[redacted]

THE KELLEX CORPORATION
233 Broadway
New York, N. Y.

Received by D. Rossland Branch or Section Sect. Date 4-19-45

Before reading this document, sign as indicated below:

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II. DESCRIPTION OF ASSEMBLED UNIT

Location

The carbon mixing equipment and storage space is located in the eastern part of Building K-1410 as shown on Figure II.2. The actual mixing equipment and the truck loading platform occupy only small part of the available space.

Service

The first requirement of the carbon mixing plant is the preparation of the carbon and alumina charges for all the carbon traps of Sections 100, 300 and 600. The amount of material required for this operation is shown by Table II.1 and Table II.2. This involves the preparation of three kinds of carbon alumina mixtures. These are listed below:

(1) Two volumes of 2-4 mesh alumina to one volume of 2 to 4 mesh carbon; used in Sections 100 and 600. See Table II.1.

(2) One and one half volumes of 2-4 mesh alumina to one volume of 6-8 mesh carbon; used in Section 300 in all buildings from K-311-1 through K-302-5. See Table II.2.

(3) One and one half volumes of 2-4 mesh alumina coated with 2% Cadmium by weight to one volume of 6-8 mesh carbon; used in Section 300 in all buildings from K-303-1 through K-312-3 including temporary purge system at K-310-10 and after Case II operation in the purge system at K-302-5. See Table II.2.

After the initial charge, renewal charges will be required at unpredictable intervals for a large number of traps. While the charge renewal rates cannot be estimated, Table II.1 and II.2 do offer information as to when a trap should be recharged. The mixing systems should be operated as often as necessary to maintain an adequate inventory of carbon charge to meet these requirements.

Mixing Operation

Figure II.1 illustrates the flow of carbon and alumina into the plant, through the carbon charge mixing equipment, to the carbon traps. The drums of carbon and barrels of alumina are received at the Building K-1410 loading platform and put into storage. When required for charge make-up, each drum is trucked to the south side of the mixing equipment under a trolley and electric hoist.

It is then raised by the hoist and dumped into the proper hopper. The south hopper is filled with carbon and the north hopper with alumina. In operation the hoppers should never be allowed to run empty.

The supply of carbon or alumina drops from the large hopper through a small feeding hopper which is part of the machine and onto the vibrating deck of the feeder. It is impelled along the deck by the vibrations and drops off the end of the deck into a common blending hopper. The mixed carbon and alumina feed then drops into a drum through the flexible sock, which is manipulated by hand to maintain a perfectly flat rising level of charge. The charge is not permitted to build up in a cone at the center of the drum, as this will result in segregation of the carbon. Each drum should be filled tightly to minimize joggling of the contents in handling the drum. As soon as one drum is filled an empty drum is moved under the sock and filling continued without stopping the vibrators. The filled drum is weighed and trucked to storage where it is stood on end.

Mixing Equipment

The mixing equipment consists primarily of two volumetric vibrating feeding machines with adjustable capacity. A hopper, mounted above each machine, serves as a source of supply of carbon to one of the vibrators and alumina to the other. An electric hoist and trolley is provided to raise the drum of carbon or barrel of alumina to its hopper. Both of the vibrating feeders discharge from their decks into a common blend hopper or chute from which the blend is delivered to a drum through a flexible canvas boot. The filled drum which is resting on a short roller conveyer is easily moved onto a portable drum stacker for lowering the drum to the floor. Hand trucks are provided to take drums to and from storage. The portable stacker is also required to raise and lower drums to and from the truck loading platform.

Charging and Discharging the Carbon Traps

When it is necessary to charge a carbon trap the drums filled and stored in Building K-1410 are transported to the location of the trap. The charge is then carefully hand scooped into a special loading bucket or bag. Loading buckets are used for the traps of Sections 100 and 300. A canvas bag is used for the traps of Section 600. The bucket or bag is then lowered into the carbon trap and discharged when resting on the bottom. The buckets have hinged bottoms which may be released. The bags are tipped over by a rope connected to the bottom. The charge in the trap is built up evenly by controlling the placement of each bucket or bag.

To discharge a carbon trap a removable special air tight chute is connected to the dump gate and a 30 gallon drum placed below. Successive portions of the spent charge are dropped into the drum at 250 lbs. per drum until the trap is empty. The drums are then stored in Building K-1031. Care is taken throughout the dumping to avoid dusting and exposure of the spent charge.

Miscellaneous

GENERAL HANDLING

In handling the drums or any containers of mixed carbon and alumina pellets, rolling the drum, walking or rocking it, or any other kind of jostling is not recommended. Such movements promote segregation of the carbon.

VENTILATION

The installed ventilation equipment consists of four gravity ventilators at the peak of the roof. No forced ventilation is installed at present. Experience may prove that it is necessary for operators to wear masks in operating the vibrators or that a fan or other means of forced ventilation is required.

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CARBON TRAP CHARGE DATA FOR SECTION 300

TRAP NUMBER (1)	SECTION (2)	SERVICE (3)	NO. OF TRAPS PER SECTION (4)	POUNDS CHARGED PER TRAP: 4 MESH ALUMINA CONE (5)	4 MESH ALUMINA CYLINDER (6)	4 MESH ALUMINA TOTAL (7)	6-8 MESH CARBON (8)	CADMIUM OXIDE* (9)	POUNDS 616 IN TRAP WHEN READY ** FOR DISCHARGE (10)
FR-301-A1 to A2	(-3)	Recovery System	2	82.4	239.7	322.1	53.3	0	53.3
FR-302-A1 to A6	(-2)	Recovery System	6	82.4	519.5	601.9	115.5	0	115.5
FR-303-A1 to A6	(-1)	Recovery System	6	184	810	994	180	0	180
FR-304-A1 to A10	(1)	Recovery System	10	184	810	994	180	0	180
FR-305-A1 to A10	(2a)	Recovery System	10	82.4	519.5	601.9	115.5	0	115.5
FR-306-A1 to A20	(2b)	Recovery System	20	82.4	519.5	601.9	115.5	10.4	115.5
FR-307-A1 to A10	(3a)	Recovery System	10	82.4	239.7	322.1	53.3	4.8	53.3
FR-308-A1 to A24	(3b)	Recovery System	24	82.4	239.7	322.1	53.3	4.8	41
FR-309-A1 to A14	(4)	Recovery System	14	32.4	161.1	193.5	35.9	3.2	13.6
FR-310-A1 to A6	(purge)	Recovery System	6	32.4	161.1	193.5	35.9	3.2	3.84

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TABLE II.1 (Cont'd.)

TRAP NUMBER (1)	SECTION (2)	SERVICE (3)	NO. OF TRAPS PER SECTION (4)	POUNDS CHARGED PER TRAP: 4 MESH ALUMINA CONE (5)	4 MESH ALUMINA CYLINDER (6)	4 MESH ALUMINA TOTAL (7)	6-8 MESH CARBON (8)	CADMIUM OXIDE* (9)	POUNDS 616 IN TRAP WHEN READY** FOR DISCHARGE (10)
FR-311-A1 to A2	(2a)	Temp. Purge & Product	2	82.4	519.5	601.9	115.5	10.4	115.5
FR-311-A3	(2a)	Temp. Purge & Product	1	82.4	519.5	601.9	115.5	10.4	115.5
FR-312-A1 to A2	(2b)	Temp. Purge & Product	2	82.4	519.5	601.9	115.5	10.4	115.5
FR-312-A3	(2b)	Temp. Purge & Product	1	82.4	519.5	601.9	115.5	10.4	115.5
FN-23A, B, C	(-3 through purge)	Seal. System Vac. Pump	3 to 36 (Total) (156)	-	-	-	38.0	-	ø
FE-1A, B, C	(purge)	Bellows Chamber Evac. Pump	3	-	-	-	445.5	-	ø
FN	(purge)	Seal Exhaust Vac. Pump	6	-	-	-	2.62	-	ø

* Impregnated on alumina in cylindrical portion of trap.

** Contents of two cells, or 100% of weight of carbon, whichever is smaller.

ø These traps will normally contain no 616 and will be discharged only when it is thought that 616 has passed into them.

DISTRIBUTION

1. K-25 Site Records (RC)
2. ChemRisk/Shonka Research Associates
3. DOE Public Reading Room
4. S. G. Thornton (K-25 EMD)